

11

above, to prevent reading of the disc a predetermined time after the solvent has left the reservoir. As one example, the reservoir 72 may be formed in a region bounded by two concentric annular ridges, similar to the stacking rings conventionally used in current optical discs.

Additional Embodiment

FIG. 17 shows a cross-sectional view that illustrates one form of a disc 100 containing a reservoir 102 as discussed immediately above. One or more capillary-tube-sized passages 104 are radially oriented to allow a suitable reading-inhibit agent (such as a solvent or a corrosive agent as discussed above) to flow from the reservoir 102 radially outwardly to the region of the disc that stores information via information-encoding features. The reservoir 102 and the passage 104 are closed by a silicone membrane 108 that defines an array of vents 110, 112. In this example, the vents 110, 112 are formed as pin pricks. The silicone membrane 108 is covered by a polycarbonate sheet 114 that defines vents on 116, 118 aligned with the vents 110, 112, respectively.

A releasable, peel-off label 120 is removably secured by a suitable adhesive to the polycarbonate layer 114. This peel-off label 122 includes a tab 122 to facilitate removal and a protrusion 124. The protrusion 124 passes through an opening in the polycarbonate layer 114 and presses the silicone membrane 108 into the passage 104 to create a mechanical valve that stops the flow of reading-inhibit agent radially outwardly from the reservoir 102. Optionally, the passage 104 may also include a valve element 106 of a material that is dissolved by the reading-inhibit agent. For example, a valve element 106 of aluminum can be used in cases where the reading-inhibit agent is corrosive to aluminum. Preferably, the reservoir 102 includes a wick 103 made of cotton or microfiber to retain fluid in the reservoir 102. The passage 104 may have a cross-sectional size of 0.02 inch.

Preferably, the peel-off label 120 is sized such that the label must be removed in order to allow the disc 100 to be read. Once the label 120 has been removed, the vents 110, 112 are opened, and the protrusion 124 is removed. This allows the silicone membrane 108 to relax upwardly, thereby opening the passage 104. When the disc 100 is rotated during a reading operation centrifugal force causes the reading-inhibit agent in the reservoir 102 to flow radially outwardly via the passage 104 onto the information-encoding portion of the disc 100.

In some embodiments the reading-inhibit agent may be selected so as not to interfere with normal reading of the disc 100 until a selected time after the reading-inhibit agent has contacted the information carrying portion of the disc. As an alternative, when the optional valve element 106 is used, the valve element 106 prevents the reading-inhibit agent from reaching the information carrying portion of the disc 100 until the valve element 106 is dissolved by the reading-inhibit agent. In this way, the plug 106 provides a timed release of the reading-inhibit agent onto the information carrying portion of the disc.

Tests have shown that two-pass transmission of the disc typically must fall to about 45 percent of the original value before a significant number of reading errors occur, and to approximately 30 percent of the original value before the disc becomes unplayable.

Conclusion

The optical discs described above have a short effective life, limited either by the number of times the disc is played (e.g. one, two or more times), or by the passage of time after the disc is dispensed (e.g. a selected number of hours after

12

the disc is sold or rented, after the consumer opens a package, or after the disc is inserted into a disc player). The effective life of the disc may be limited in response to reading of the disc, opening of the disc, or rotation of the disc. Various methods for limiting the effective life of the disc have been described, including physical, chemical, and electrochemical methods. Physical methods include the diffusion of air or a component of air such as oxygen, resulting in physical and/or chemical effects; the use of optical activation to cause a physical change in the disc; or the use of physical forces or the removal of forces associated with rotation of the disc or removal of a label to cause a physical change in the disc. Chemical methods include a layer of the disc interacting with a chemical applied when the package is opened or by the vendor at the time of sale. Electrical or electrochemical methods include the use of an electrochemically active system to accelerate corrosion.

It should be apparent from the foregoing detailed description that the present invention can be implemented in a wide variety of forms. Barrier layers can take the form of sheets or patches on a surface of the disc, or of encapsulating packaging. In some cases barrier layers are not required. Reading-inhibit agents can take many forms, including materials which change optical or physical characteristics of the reflecting layer, or various other components of the optical disc. Reading-inhibit agents can be employed as microencapsulated materials, materials formed in layers over selected regions of a disc, or materials incorporated into other components of a disc. Reading-inhibit agents may extend over the entire information-encoding surface of the optical disc, or alternately may be limited to selected portions, for example portions that encode indexing or other introductory information.

It should therefore clearly be understood that the foregoing detailed description is intended by way of illustration, not limitation. It is only the following claims, including all equivalents, that are intended to define the scope of this invention.

We claim:

1. A method for inhibiting reading of an optical disc, comprising the following steps:

- (a) providing an optical disc comprising machine-readable, information-encoding features, and a reading-inhibit agent, said inhibit agent activated by optical radiation and operative, once activated, to alter the disc to inhibit reading and to provide a short effective life for the disc;
- (b) providing a reading device operative to read the disc, said reading device comprising a source of optical radiation; and
- (c) reading the disc with the source while concurrently activating the inhibit agent with optical radiation from the source.

2. A method for inhibiting reading of an optical disc, said method comprising the following steps:

- (a) providing an optical disc comprising: machine-readable, information-encoding features; a barrier layer releasably coupled to the disc, said barrier layer configured to prevent machine reading of the features; and, a reading-inhibit agent, included in the disc and activated by removal of the barrier layer, said reading-inhibit agent operative, once activated, to initially allow reading of the disc, and then to alter the disc to inhibit reading of the disc; then
- (b) removing the barrier layer to allow machine reading of the features and to activate the reading inhibit agent; then,

13

(c) reading the disc after removal of the barrier layer but before the disc is altered by the reading inhibit agent to inhibit reading of the disc; and then,

(d) said reading-inhibit agent then altering the disc to provide a short effective life for the disc.

3. The invention of claim 2 wherein the disc comprises a first surface, wherein the features are adjacent the first surface, wherein the inhibit agent is adjacent the features: and wherein the barrier layer is adjacent the inhibit agent.

4. The invention of claim 2 wherein the disc comprises a translucent layer operative to transmit a beam of light toward the features, wherein the inhibit agent is incorporated

14

in or adjacent to the translucent layer, and wherein the barrier layer comprises a sheet adjacent the translucent layer.

5. The invention of claim 2 wherein the disc comprises a reflective film, and wherein the inhibit agent comprises a corrosion-enhancing agent disposed in or adjacent to the reflective film.

6. The invention of claim 2 wherein the inhibit agent is operative, once activated, to alter a physical dimension of the disc.

* * * * *